

Preliminary Amendment

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For: TOOLS TO MANUFACTURE ABRASIVE ARTICLES

plurality of angles forming the geometric shape, wherein at least one of the angles of the first plurality is different from all of the angles of the second and third plurality of angles, and wherein at least one of the angles of the second plurality is different from all of the angles of the first and third plurality of angles.

24. (AMENDED) A production tool suitable for use in manufacturing an abrasive article comprising a first, second, third, and fourth plurality of cavities, wherein the first plurality of cavities each have a first geometric shape and first plurality of angles forming the geometric shape, the second plurality of cavities each have a second geometric shape and second plurality of angles forming the geometric shape, the third plurality of cavities each have a third geometric shape and third plurality of angles forming the geometric shape, and the fourth plurality of cavities each have a fourth geometric shape and fourth plurality of angles forming the geometric shape, wherein at least one of the angles of the first plurality is different from all of the angles of the second, third, and fourth plurality of angles, wherein at least one of the angles of the second plurality is different from all of the angles of the first, third, and fourth plurality of angles, and wherein at least one of the angles of the third plurality is different from all of the angles of the first, second, and fourth plurality of angles.

56. (AMENDED) A method of making a production tool, the method comprising:

creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a first, second, and third plurality of cavities, wherein the first plurality of cavities each have a first geometric shape and first plurality of angles forming the geometric shape, the second plurality of cavities each have a second geometric shape and second plurality of angles forming the geometric shape, and the third plurality of cavities each have a third geometric shape and third plurality of angles forming the geometric shape, wherein at least one of the angles of the first plurality is different from all of the angles of the second and third plurality of angles, and wherein at

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least one of the angles of the second plurality is different from all of the angles of the first and third plurality of angles; and

forming the production tool using the design.

57. (AMENDED) A method of making a production tool, the method comprising: creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a first, second, third, and fourth plurality of cavities, wherein the first plurality of cavities each have a first geometric shape and first plurality of angles forming the geometric shape, the second plurality of cavities each have a second geometric shape and second plurality of angles forming the geometric shape, the third plurality of cavities each have a third geometric shape and third plurality of angles forming the geometric shape, and the fourth plurality of cavities each have a fourth geometric shape and fourth plurality of angles forming the geometric shape, wherein at least one of the angles of the first plurality is different from all of the angles of the second, third, and fourth plurality of angles, wherein at least one of the angles of the second plurality is different from all of the angles of the first, third, and fourth plurality of angles, and wherein at least one of the angles of the third plurality is different from all of the angles of the first, second, and fourth plurality of angles; and

forming the production tool using the design.

88. (NEW) The production tool of claim 22, wherein the first geometric shape includes a base and first plurality of base edge lengths, wherein the second geometric shape includes a base and second plurality of base edge lengths, and wherein at least one of the base edge lengths of the first plurality is different from all of the base edge lengths of the second plurality of base edge lengths.

89. (NEW) The production tool of claim 23, wherein the first geometric shape includes a base and first plurality of base edge lengths, wherein the second geometric shape includes a base and second plurality of base edge lengths, wherein the third geometric shape includes a base and third

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plurality of base edge lengths, wherein at least one of the base edge lengths of the first plurality is different from all of the base edge lengths of the second and third plurality of base edge lengths, and wherein at least one of the base edge lengths of the second plurality is different from all of the base edge lengths of the first and third plurality of base edge lengths.

90. (NEW) The production tool of claim 24, wherein the first geometric shape includes a base and first plurality of base edge lengths, wherein the second geometric shape includes a base and second plurality of base edge lengths, wherein the third geometric shape includes a base and third plurality of base edge lengths, wherein the fourth geometric shape includes a base and fourth plurality of base edge lengths, wherein at least one of the base edge lengths of the first plurality is different from all of the base edge lengths of the second, third, and fourth plurality of base edge lengths, wherein at least one of the base edge lengths of the second plurality is different from all of the base edge lengths of the first, third, and fourth plurality of base edge lengths, and wherein at least one of the base edge lengths of the third plurality is different from all of the base edge lengths of the first, second, and fourth plurality of base edge lengths.

91. (NEW) A production tool suitable for use in manufacturing an abrasive article comprising a first and second plurality of cavities, wherein the first plurality of cavities each have a first geometric shape including a base and first plurality of base edge lengths forming the base of the geometric shape and the second plurality of cavities each have a second geometric shape including a base and second plurality of base edge lengths forming the base of the geometric shape, wherein at least one of the base edge lengths of the first plurality is different from all of the base edge lengths of the second plurality of base edge lengths.

92. (NEW) A production tool suitable for use in manufacturing an abrasive article comprising a first, second, and third plurality of cavities, wherein the first plurality of cavities each have a first geometric shape including a base and first plurality of base edge lengths forming the base of the

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geometric shape, the second plurality of cavities each have a second geometric shape including a base and second plurality of base edge lengths forming the base of the geometric shape, and the third plurality of cavities each have a third geometric shape including a base and third plurality of base edge lengths forming the base of the geometric shape, wherein at least one of the base edge lengths of the first plurality is different from all of the base edge lengths of the second and third plurality of base edge lengths, and wherein at least one of the base edge lengths of the second plurality is different from all of the base edge lengths of the first and third plurality of base edge lengths.

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93. (NEW) A production tool suitable for use in manufacturing an abrasive article comprising a first, second, third, and fourth plurality of cavities, wherein the first plurality of cavities each have a first geometric shape including a base and first plurality of base edge lengths forming the base of the geometric shape, the second plurality of cavities each have a second geometric shape including a base and second plurality of base edge lengths forming the base of the geometric shape, the third plurality of cavities each have a third geometric shape including a base and third plurality of base edge lengths forming the base of the geometric shape, and the fourth plurality of cavities each have a fourth geometric shape including a base and fourth plurality of base edge lengths forming base of the geometric shape, wherein at least one of the base edge lengths of the first plurality is different from all of the base edge lengths of the second, third, and fourth plurality of base edge lengths, wherein at least one of the base edge lengths of the second plurality is different from all of the base edge lengths of the first, third, and fourth plurality of base edge lengths, and wherein at least of the base edge lengths one of the third plurality is different from all of the base edge lengths of the first, second, and fourth plurality of base edge lengths.

Sub D51

~~94. (NEW) A production tool suitable for use in manufacturing an abrasive article comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, the dimensions including base edge lengths, wherein at least 10% of pairs of adjacent cavities have at least one base edge length different between the two cavities of the pair.~~

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Sub 5
95. ~~(NEW) A production tool suitable for use in manufacturing an abrasive article comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, the dimensions including base edge lengths, wherein at least 30% of pairs of adjacent cavities have at least one base edge length different between the two cavities of the pair.~~

96. (NEW) A production tool suitable for use in manufacturing an abrasive article comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, the dimensions including base edge lengths, wherein at least 50% of pairs of adjacent cavities have at least one base edge length different between the two cavities of the pair.

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97. (NEW) A production tool suitable for use in manufacturing an abrasive article comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, the dimensions including base edge lengths, and wherein at least two adjacent cavities have at least one base edge lengths different between the two cavities.

Sub C5
98. ~~(NEW) The production tool of claim 91 which is a coating roll.~~

99. (NEW) The production tool of claim 92 which is a coating roll.

100. (NEW) The production tool of claim 93 which is a coating roll.

101. (NEW) The production tool of claim 94 which is a coating roll.

102. (NEW) The production tool of claim 95 which is a coating roll.

103. ~~(NEW) The production tool of claim 96 which is a coating roll.~~

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Sub
C5

104. (NEW) The production tool of claim 97 which is a coating roll.

105. (NEW) The production tool of claim 91 which is an engraved metal roll.

106. (NEW) The production tool of claim 92 which is an engraved metal roll.

107. (NEW) The production tool of claim 93 which is an engraved metal roll.

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108. (NEW) The production tool of claim 94 which is an engraved metal roll.

109. (NEW) The production tool of claim 95 which is an engraved metal roll.

110. (NEW) The production tool of claim 96 which is an engraved metal roll.

111. (NEW) The production tool of claim 97 which is an engraved metal roll.

112. (NEW) A method of making a production tool, the method comprising:

creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a first and second plurality of cavities, wherein the first plurality of cavities each have a first geometric shape including a base and first plurality of base edge lengths forming the base of the geometric shape and the second plurality of cavities each have a second geometric shape including a base and second plurality of base edge lengths forming the base of the geometric shape, wherein at least one of the base edge lengths of the first plurality is different from all of the base edge lengths of the second plurality of base edge lengths; and

forming the production tool using the design.

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113. (NEW) A method of making a production tool, the method comprising:

creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a first, second, and third plurality of cavities, wherein the first plurality of cavities each have a first geometric shape including a base and first plurality of base edge lengths forming the base of the geometric shape, the second plurality of cavities each have a second geometric shape including a base and second plurality of base edge lengths forming the base of the geometric shape, and the third plurality of cavities each have a third geometric shape including a base and third plurality of base edge lengths forming the base of the geometric shape, wherein at least one of the base edge lengths of the first plurality is different from all of the base edge lengths of the second and third plurality of base edge lengths, and wherein at least one of the base edge lengths of the second plurality is different from all of the base edge lengths of the first and third plurality of base edge lengths; and

forming the production tool using the design.

114. (NEW) A method of making a production tool, the method comprising:

creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a first, second, third, and fourth plurality of cavities, wherein the first plurality of cavities each have a first geometric shape including a base and first plurality of base edge lengths forming the base of the geometric shape, the second plurality of cavities each have a second geometric shape including a base and second plurality of base edge lengths forming the base of the geometric shape, the third plurality of cavities each have a third geometric shape including a base and third plurality of base edge lengths forming the base of the geometric shape, and the fourth plurality of cavities each have a fourth geometric shape including a base and fourth plurality of base edge lengths forming the base of the geometric shape, wherein at least one of the base edge lengths of the first plurality is different from all of the base edge lengths of the second, third, and fourth plurality of base edge lengths, wherein at least one of the base edge lengths of the second plurality is different from all of the base edge lengths of the first, third, and fourth plurality of base edge lengths,

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and wherein at least one of the base edge lengths of the third plurality is different from all of the base edge lengths of the first, second, and fourth plurality of base edge lengths; and
forming the production tool using the design.

115. (NEW) A method of making a production tool, the method comprising:
creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, the dimensions including base edge lengths wherein at least 10% of pairs of adjacent cavities have at least one base edge length different between the two cavities of the pair; and
forming the production tool using the design.

116. (NEW) A method of making a production tool, the method comprising:
creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, the dimensions including base edge lengths wherein at least 30% of pairs of adjacent cavities have at least one base edge length different between the two cavities of the pair; and
forming the production tool using the design.

117. (NEW) A method of making a production tool, the method comprising:
creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, the dimensions including base edge lengths wherein at least 50% of pairs of adjacent cavities have at least one base edge length different between the two cavities of the pair; and
forming the production tool using the design.

118. (NEW) A method of making a production tool, the method comprising:

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creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, the dimensions including base edge lengths, and wherein at least two adjacent cavities have at least one base edge lengths different between the two cavities; and
forming the production tool using the design.

119. (NEW) The method of claim 112, wherein the production tool is a coating roll.

120. (NEW) The method of claim 113, wherein the production tool is a coating roll.

121. (NEW) The method of claim 114, wherein the production tool is a coating roll.

122. (NEW) The method of claim 115, wherein the production tool is a coating roll.

123. (NEW) The method of claim 116, wherein the production tool is a coating roll.

124. (NEW) The method of claim 117, wherein the production tool is a coating roll.

125. (NEW) The method of claim 118, wherein the production tool is a coating roll.

126. (NEW) The method of claim 112, wherein the production tool is an engraving roll.

127. (NEW) The method of claim 113, wherein the production tool is an engraving roll.

128. (NEW) The method of claim 114, wherein the production tool is an engraving roll.

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129. (NEW) The method of claim 115, wherein the production tool is an engraving roll.
130. (NEW) The method of claim 116, wherein the production tool is an engraving roll.
131. (NEW) The method of claim 117, wherein the production tool is an engraving roll.
132. (NEW) The method of claim 118, wherein the production tool is an engraving roll.
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